

Date: Wednesday, 4/5/2006 3:30:43 PM
 User: Kim Johnston

Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: FWD TUBE ASSEMBLY
Job Number	: 26569		
Estimate Number	: 10467		
P.O. Number	: N/A	Part Number	: D3391021
This Issue	: 4/5/2006	S.O. No.	: N/A
Prsht Rev.	: NC	Drawing Number	: D3391 REV D
First Issue	: N/A	Project Number	: N/A
Previous Run	: 26568	Drawing Revision	: D
		Material	: N/A
Written By	: <u>See 1A COMMENT BEW</u>	Due Date	: 4/28/2006
Checked & Approved By	: <u>06.04.06 W</u>	Qty:	1 Um: Each
Comment	: Est. A 05.09.10 New issue KJ/JLM Est. B 06.02.10 Dwg rev.D ech 773 EC		

Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

1.0	D6013047	SKIDTUBE MAT'L
-----	----------	----------------



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

SKIDTUBE MAT'L

Pick:

Qty	Part Number	Description	Batch
1	D6013-047	Extrusion	B23935 DP06-4-9

2.0	LANDING GEAR 1	LANDING GEAR RESOURCE 1
-----	----------------	-------------------------



Comment: LANDING GEAR RESOURCE 1

Cut extrusion to 46.52 +0.010 -0.020

WHL 06/04/10

3.0	BENDING	BENDING MACHINE
-----	---------	-----------------



Comment: Nc bender

Bend as per Dwg D3391 Using Bend Prog 3391021

DP06-4-12

4.0	QC5	INSPECT WORK TO CURRENT STEP
-----	-----	------------------------------



Comment: INSPECT WORK TO CURRENT STEP

06.04.13

5.0	HAAS1	HAAS CNC VERTICAL MACHINING #1
-----	-------	--------------------------------



Comment: HAAS CNC VERTICAL MACHINING #1

1-Machine as per Folio FA590 Rev. AA & Dwg D3391 Rev. D

Identify as D3391-1

2-Deburr

WHL 06/04/10

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/5/2006 3:30:43 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: FWD TUBE ASSEMBLY

Job Number: 26569

Part Number: D3391021

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

7m 06/04/16

7.0

QC8

SECOND CHECK



Comment: SECOND CHECK

M8 06/04/26

8.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill and c/sink float bag holes as per Dwg D3391 using DT8798(Do not open tow cap holes to finish size)
(ONLY DRILL HOLES MARKED "A") *BE 06-04-27 ①*

2-Drill Remaining two holes for tow cap using DT 8819 Locating off of .1875" holes drilled in previous step *BE 06-04-27 ①*

3-Open tow cap holes to .208" as per Dwg D3391 *BE 06-04-27 ①*

4-Open Tow Ring hole to .640" as per Dwg D3391 *BE 06-04-27 ①*

5-Drill wearplate holes as per Dwg D3391 Using Dt8217 & DT8878 *BE 06-04-27 ①*

6--Deburr

BE 06-04-27 ①

9.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Acid etch and Alodine as per QSI 005 4.1

FC 06 05 03 ①

10.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

DL 06/06/14 ①

11.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

G.M 06-06-15 ①

8.1 QC5 DP 06-5-2

9.1 QC3 DL 06/06/14 ①

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/5/2006 3:30:44 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: FWD TUBE ASSEMBLY

Job Number: 26569

Part Number: D3391021

Job Number:



Seq. #: Machine Or Operation: Description :

12.0 D3401041 Tow Cap Assembly



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Tow Cap Assembly

Pick:

Qty	Part Number	Description	Batch
1	D3401-041	Tow Cap	B26590

13.0 AN3C4A BOLT



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Bolt

Pick:

Qty	Part Number	Description	Batch
4	AN3C4A	Bolt	M100651

14.0 NAS1330C3KB166



Comment: Qty.: 14.0000 Each(s)/Unit Total : 14.0000 Each(s)

Rivnut

Pick:

Qty	Part Number	Description	Batch
14	NAS1330C3KB166	Insert	M100732

15.0 NAS1515H3L WASHER



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Washer

Pick:

Qty	Part Number	Description	Batch
4	NAS1515H3L	Washer	M100186

16.0 AN960C10L washer



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

washer

M18822 DL 04/04/2006 (1)

17.0 HAND FINISHING1 HAND FINISHING RESOURCE #1



Comment: SMALL & MEDIUM FAB RESOURCE 1

Install inserts and Tow Cap as per Dwg D3391

Identify as D3391-021

DL 04/04/06 P70

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng/ Prod Mgr	Approval QC Inspector
06/06/15	17	QC5 inspection after installing inserts	<i>[Signature]</i>	06/06/15	1	<i>[Signature]</i> 06-06-27	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: *[Signature]* Date: 06/06/09.

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/5/2006 3:30:44 PM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: FWD TUBE ASSEMBLY

Job Number: 26569

Part Number: D3391021

Job Number:



Seq. #:

Machine Or Operation:

Description :

18.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

Inspect thread of each insert using DT8821

Handwritten: 06 06 28 (1)

19.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location:

Handwritten: N/A

Handwritten: 06/06/28

20.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Inspection Level 21

Handwritten: 06/06/29 (1)

Job Completion



Handwritten: 06-28

Dart Aerospace Ltd

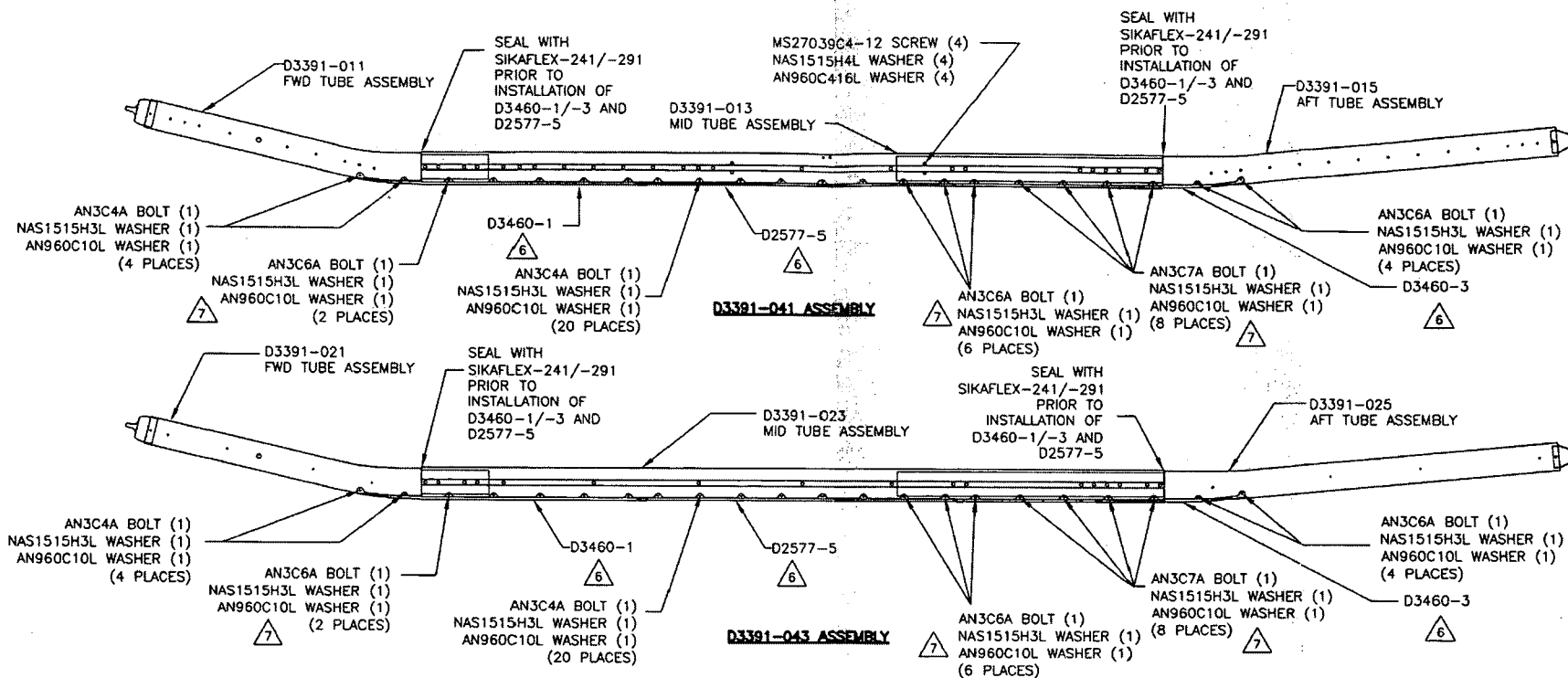
W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



D3391-041/-043 FLOAT SKIDTUBE ASSEMBLY PARTS LIST

QTY - 041	QTY - 043	PART NUMBER	DESCRIPTION
X	X	D3391-041	FLOAT SKIDTUBE ASSEMBLY
		D3391-043	FLOAT SKIDTUBE ASSEMBLY
1		D3391-011	FWD TUBE ASSEMBLY
1		D3391-013	MID TUBE ASSEMBLY
1		D3391-015	AFT TUBE ASSEMBLY
	1	D3391-021	FWD TUBE ASSEMBLY
	1	D3391-023	MID TUBE ASSEMBLY
	1	D3391-025	AFT TUBE ASSEMBLY
24	24	AN3C4A	BOLT
12	12	AN3C6A	BOLT
8	8	AN3C7A	BOLT
44	44	NAS1515H3L	WASHER
44	44	AN960C10L	WASHER
4		MS27039C4-12	SCREW
4		NAS1515H4L	WASHER
4		AN960C416L	WASHER
1	1	D2577-5	WEARSHOE
1	1	D3460-1	WEARSHOE
1	1	D3460-3	WEARSHOE

GENERAL NOTES

- ALL DIMENSIONS ARE IN INCHES
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- FINISH: ACID ETCH AND ALODINE PER DART QSI 005 4.1
POWDER COAT WHITE (4.3.5.1) PER DART QSI 005 4.3
- SPRAY INSIDE OF TUBE WITH A COAT OF LPS LABORATORIES "LPS-3" AFTER FINISH AND AFTER INSTALLATION OF INSERTS. COAT ALL EXPOSED FASTENERS WITH LPS LABORATORIES "LPS PROCYON" AFTER FINAL ASSEMBLY. CLEAN EXCESS OFF POWDER COATING WITH MEK DEGREASER.
- USE DART DRILL TEMPLATE DT8217 TO LOCATE AND DRILL 'E' SIZE HOLES (#0.250-#0.257) FOR WEARSHOE INSERTS.
- C/SINK #0.391/#0.425 x 100" AS APPLICABLE AND INSTALL INSERTS EXCEPT WHERE INDICATED.
- APPLY A LAYER OF SIKAFLEX -241/-291 ADHESIVE BETWEEN THE BOTTOM OF THE SKIDTUBE ASSEMBLY AND THE WEARPLATES
- DO NOT TORQUE, HAND TIGHTEN ONLY

RELEASED

06.01.27

D	06.01.23	UPDATE TOLERANCE, CHANGE HOLE SIZE
C	05.09.27	LENGTHEN AFT EXTENSION
B	05.06.10	DRAWING UPDATES
A	05.02.07	NEW ISSUE
DESIGN	PH	DRAWN BY
CHECKED	PH	APPROVED
DATE	06.01.23	TITLE
		412 FLOAT SKIDTUBE

COPYRIGHT © 2005 BY DART AEROSPACE USA, INC.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE USA, INC.

DART DART AEROSPACE USA, INC.

PORT HADLOCK, MA

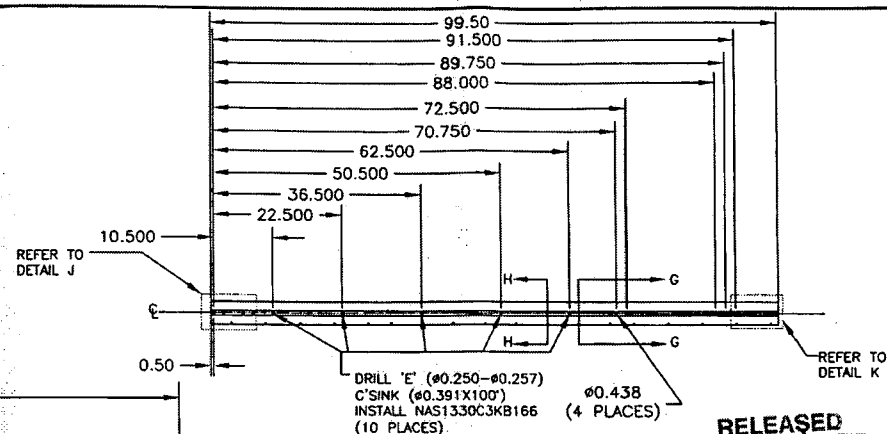
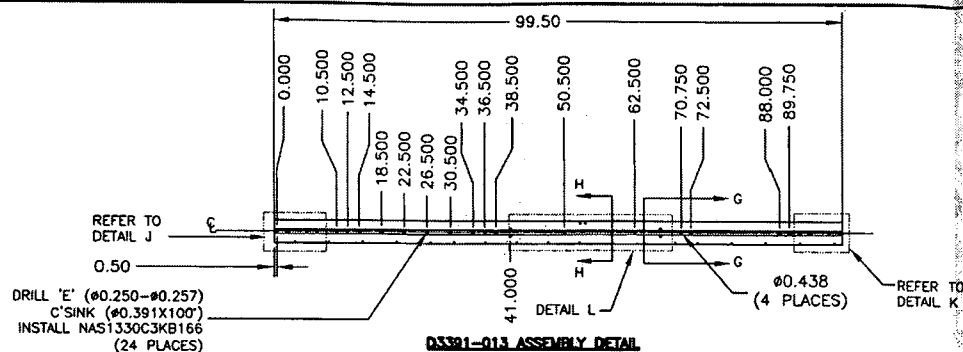
DRAWING NO. D3391

REV. D SHEET 1 OF 5

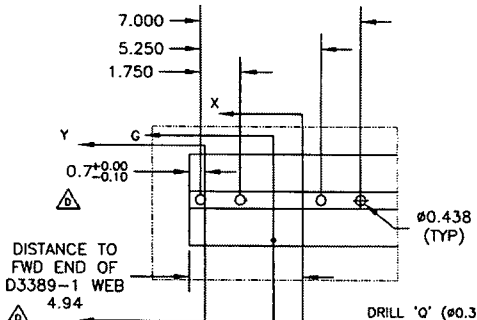
SCALE

NTS

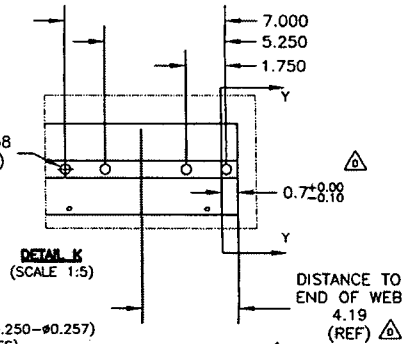
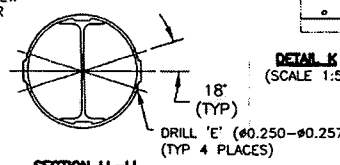
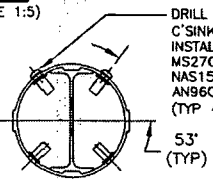
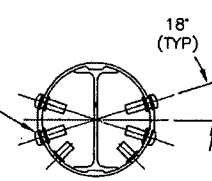
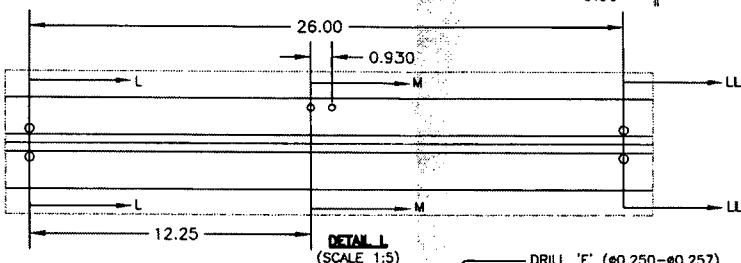
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
26569
SHOP COPY
RETURN TO
ENGINEERING



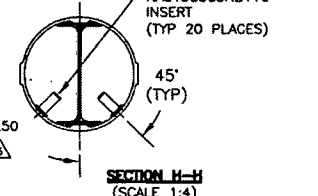
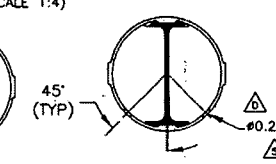
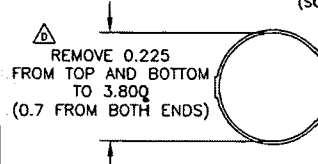
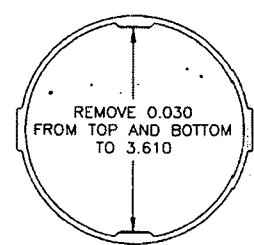
RELEASED
06.01.23



DRILL 'G' (#0.332-#0.338)
INSTALL NAS1329C4KB140 INSERT
MS27039C4-08 SCREW
NAS1515H4L WASHER
AN960C416L WASHER
(TYP 4 PLACES)



NAS1330C3KB116
INSERT
(TYP 20 PLACES)



D3391-013/-023 MID TUBE ASSEMBLY PARTS LIST

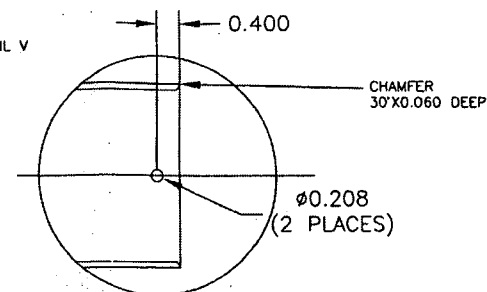
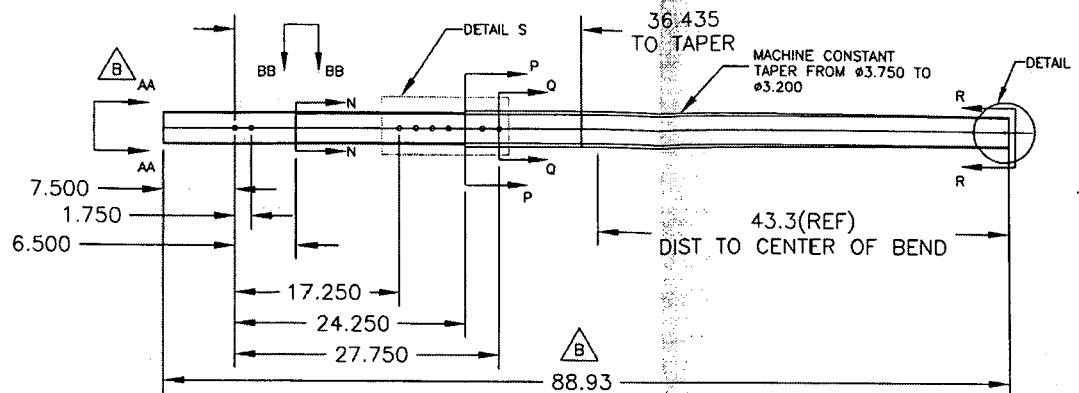
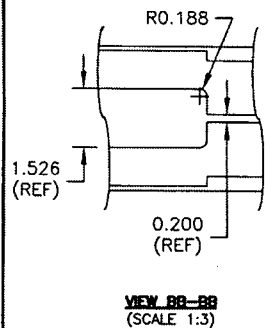
QTY - 013	QTY - 023	PART NUMBER	DESCRIPTION
X	X	D3391-013	MID TUBE ASSEMBLY
		D3391-023	MID TUBE ASSEMBLY
1	1	D2500-1-100	EXTRUSION
1	1	D3389-1	WEB
24	20	NAS1330C3KB116	INSERT
24	10	NAS1330C3KB166	INSERT
4		NAS1329C4KB140	INSERT
4		NAS1515H3L	WASHER
4		AN960C10L	WASHER
4		NAS1515H4L	WASHER
4		AN960C416L	WASHER
4		MS27039C1-09	SCREW
4		MS27039C4-08	SCREW

D3391-013/-023 MID TUBE ASSEMBLY

- MATERIAL: MAKE FROM D2500-1-100 EXTRUSION
- INSTALL D3389-1 WEB TO OUTER TUBE USING SIKAFLEX-241-291 PER

SHOP COPY
RETURN TO
ENGINEERING
CONTROLLED COPY
SUBJECT TO ATTENDMENT
WITHOUT NOTICE
WORK ORDER
26564

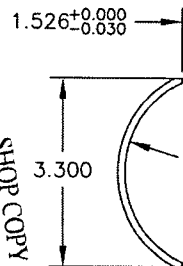
COPYRIGHT © 2005 BY DART AEROSPACE USA, INC.		DESIGN PH	DRAWN BY PH	DART DART AEROSPACE USA, INC. PORT HADLOCK, OH
CHECKED #	APPROVED #	DRAWING NO. D3391	REV. D SHEET 3 OF 5	
DATE 06.01.23	TITLE 412 FLOAT SKIDTUBE		SCALE 1:20	



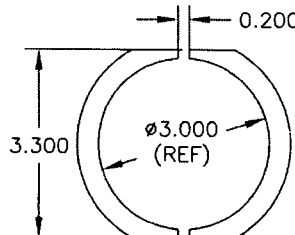
RELEASED
06.01.23

D3391-3 AFT DRILLING AND CUTTING DETAIL
(MAKE FROM D6014-090 SKIDTUBE MATERIAL)

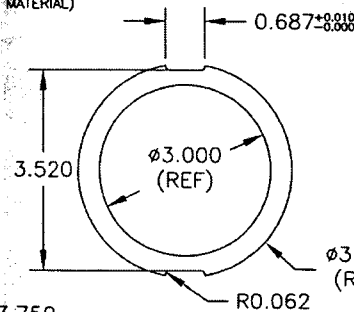
NO. 2656
WORK ORDER
SUBJECT TO AMENDMENT
WITHOUT NOTICE
ENGINEERING
RETURN TO
SHOP COPY
UNCONTROLLED COPY



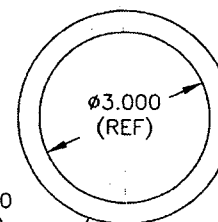
SECTION AA-AA
(SCALE 1:2)



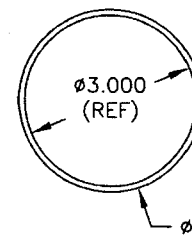
SECTION N-N
(SCALE 1:2)



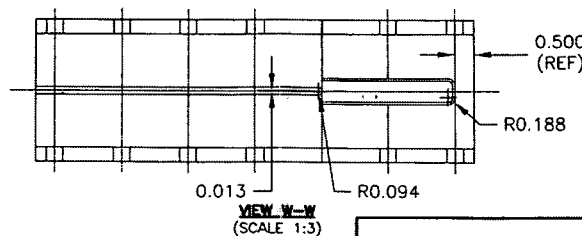
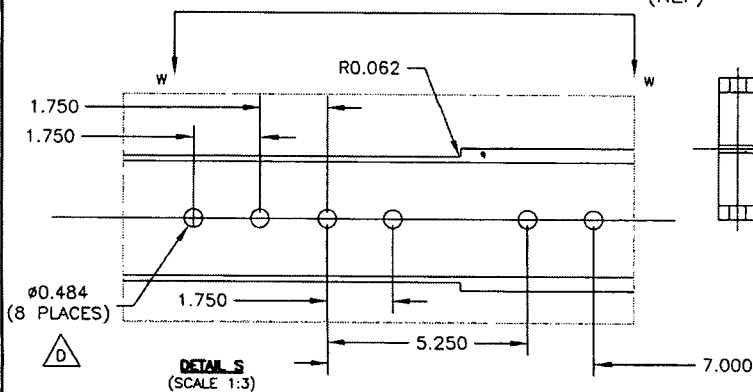
SECTION P-P
(SCALE 1:2)



SECTION Q-Q
(SCALE 1:2)



SECTION R-R
(SCALE 1:2)

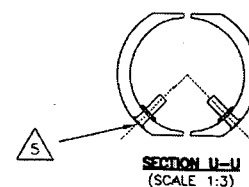
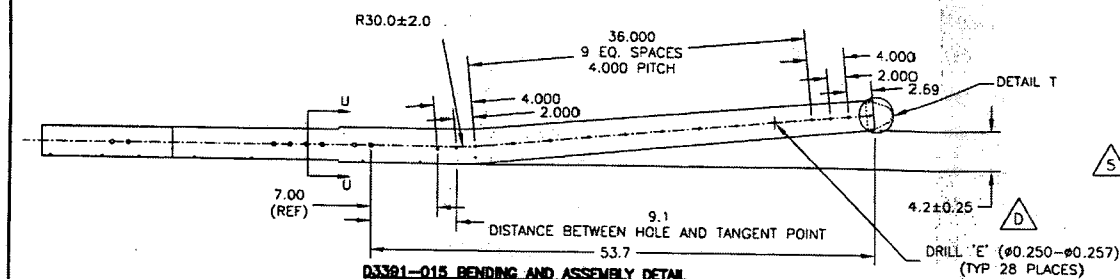


COPYRIGHT © 2005 BY DART AEROSPACE USA, INC.

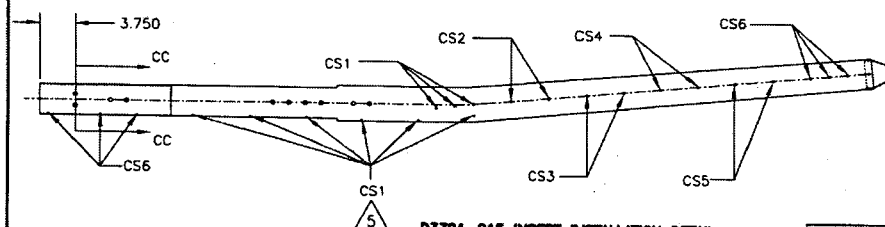
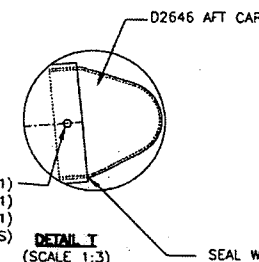
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE USA, INC.

DESIGN	PH	DRAWN BY	PH	DART DART AEROSPACE USA, INC. PORT HADLOCK, MA	REV. D
CHECKED	#	APPROVED	#	DRAWING NO. D3391	SHEET 4 OF 5
DATE	06.01.23	TITLE	412 FLOAT SKIDTUBE	SCALE	1:12

RELEASED
06.01.27



AN3C4A BOLT (1)
NAS1515H3L WASHER (1)
AN960C10L WASHER (1)
(2 PLACES)



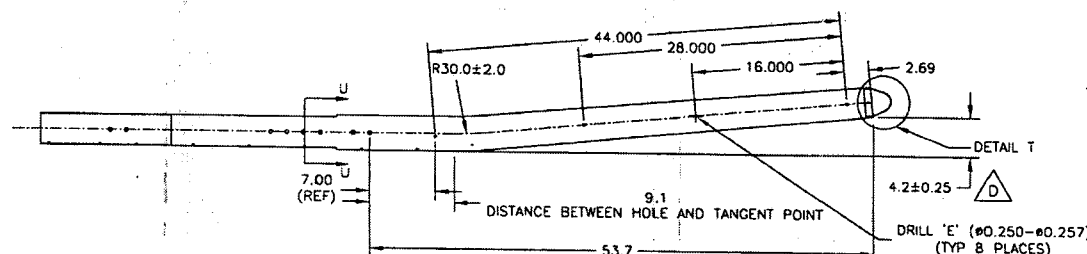
D3391-015 INSERT INSTALLATION DETAIL
(SEE TABLE)

C'SINK AND INSTALL AESS10KBXXX AND/OR
NAS1330C3KBXXX IN HOLES MARKED CS1-CS6 AS
FOLLOWS

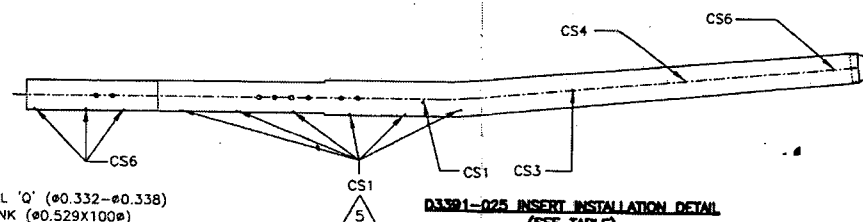
HOLES MARKED	QTY D3391-015	QTY D3391-025	C'SINK	P/N
CS1	18	14	Ø0.425	AESS10KB366
CS2	4		Ø0.391	AESS10KB366
CS3	4	2	Ø0.391	NAS1330C3KB316
CS4	4	2	Ø0.391	NAS1330C3KB266
CS5	4		Ø0.391	NAS1330C3KB216
CS6	12	8	Ø0.391	NAS1330C3KB166

D3391-015/-025 AFT TUBE ASSEMBLY PARTS LIST

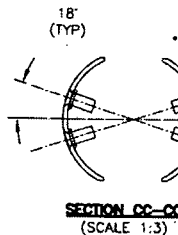
QTY - 015	QTY - 025	PART NUMBER	DESCRIPTION
X		D3391-015	AFT TUBE ASSEMBLY
	X	D3391-025	AFT TUBE ASSEMBLY
1	1	D6014-090	AFT TUBE
1	1	D2646	AFT CAP
18	14	AESS10KB366	INSERT
4	2	NAS1330C3KB316	INSERT
4	2	NAS1330C3KB266	INSERT
4		NAS1330C3KB216	INSERT
12	8	NAS1330C3KB166	INSERT
4		NAS1330C4KB151	INSERT
2	2	AN3C4A	BOLT
2	2	NAS1515H3L	WASHER
2	2	AN960C10L	WASHER



D3391-025 BENDING AND ASSEMBLY DETAIL



DRILL 'O' (Ø0.332-Ø0.338)
C'SINK (Ø0.529X100°)
NAS1330C4KB151 INSERT (1)
(4 PLACES)



COPYRIGHT © 2005 BY DART AEROSPACE USA, INC.

THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL
AND IS SUPPLIED ON THE EXPRESS CONDITION
THAT IT IS NOT TO BE USED FOR ANY PURPOSE
OR COPIED OR COMMUNICATED TO ANY OTHER
PERSON WITHOUT WRITTEN PERMISSION FROM
DART AEROSPACE USA, INC.

DESIGN PH	DRAWN BY PH	DART DART AEROSPACE USA, INC. PORT HADLOCK, OH
CHECKED #	APPROVED #	DRAWING NO. D3391
DATE 06.01.23	TITLE 412 FLOAT SKIDTUBE	REV. D SHEET 5 OF 5 SCALE 1:12

WORK ORDER
26569
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
ENGINEERING
RETURN TO
SHOP COPY
36569

Peter Hum

From: David Shepherd [davids@dartaero.com]
Sent: Friday, April 21, 2006 10:59 AM
To: Peter Hum
Subject: Re: D3391-1 fwd tube tolerance update

The deviation on tolerance shown in your sketch is acceptable for current production and would be acceptable for future production with a drawing change and confirmation that production can work to these tolerances.

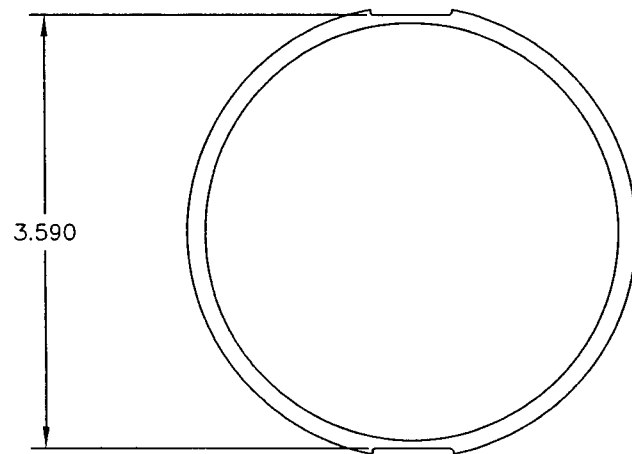
When you do the design review for the drawing change, ensure to include the sketch. I would suggest that we submit the updated dwg when we submit the drawings for the cable guard.

David

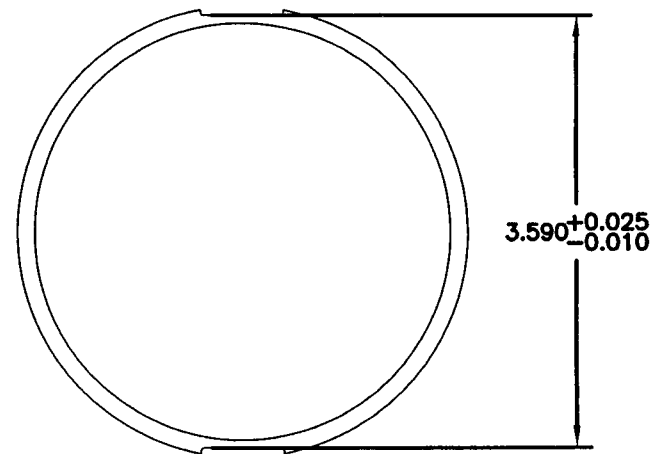
----- Original Message -----

From: "Peter Hum" <phum@dartaero.com>
To: "David Shepherd (E-mail)" <davids@dartaero.com>
Sent: Wednesday, April 19, 2006 12:53 PM
Subject: D3391-1 fwd tube tolerance update

> David,
>
> I've attached a sketch (the proposed changes are in black),
>
> In machining the D3391-1 fwd tube, the dimensions of Section D-D and
Section
> C-C vary above/below the specified tolerance. In the majority of the cases
> the end result is more material and therefore an increase in strength.
>
> At the worst case tolerance (i.e. smallest area) the reduction in area is
> 0.5%. However in the critical section of the FWD tube, the ultimate margin
> of safety is 21%. Therefore, this reduction in area is very small compared
> to the overall margin of safety; therefore it will be acceptable.
>
> Can these deviations be applied to current and future production (will
> require drawing update)?
>
> Peter
>
>

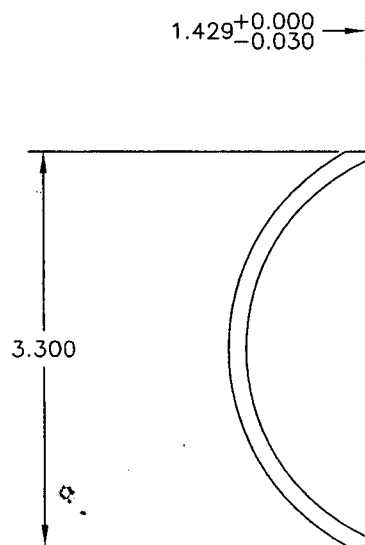


NOMINAL DIMENSION

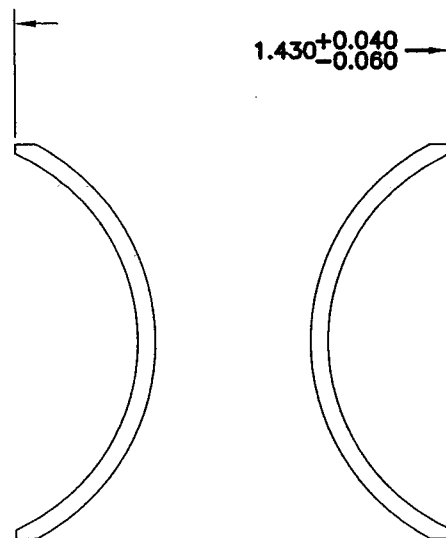


NEW DIMENSION/TOLERANCE
1) WORST CASE IS MORE MATERIAL

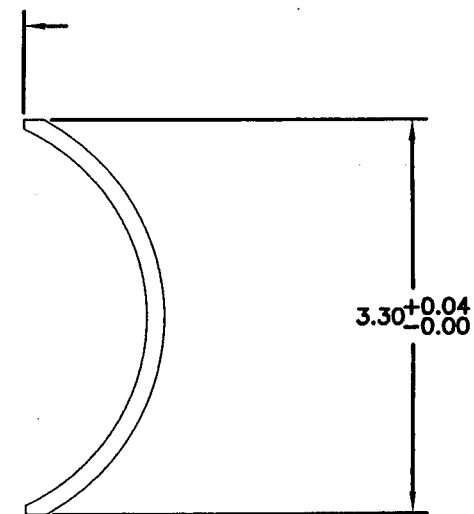
SECTION D-D



NOMINAL DIMENSION
AREA = 1.1853 IN^2



NEW DIMENSION/TOLERANCE
MINIMUM AREA = 1.179 IN^2



- 1) AT THE WORST CASE THE AREA IS REDUCED BY 0.5%
- 2) THE ULTIMATE MARGIN OF SAFETY OF THE CRITICAL SECTION IN THIS REGION OF THE SKIDTUBE IS 21%
- 3) THEREFORE, THIS REDUCTION WILL NOT BE A FACTOR

SECTION C-C

